

# SoS/Interoperability IPT

*Integrating Lockheed Martin Strengths  
...Realizing Military Value*

## Capability Integration

*Framework for Developing  
C4ISTAR Solutions*

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21 September 2001*



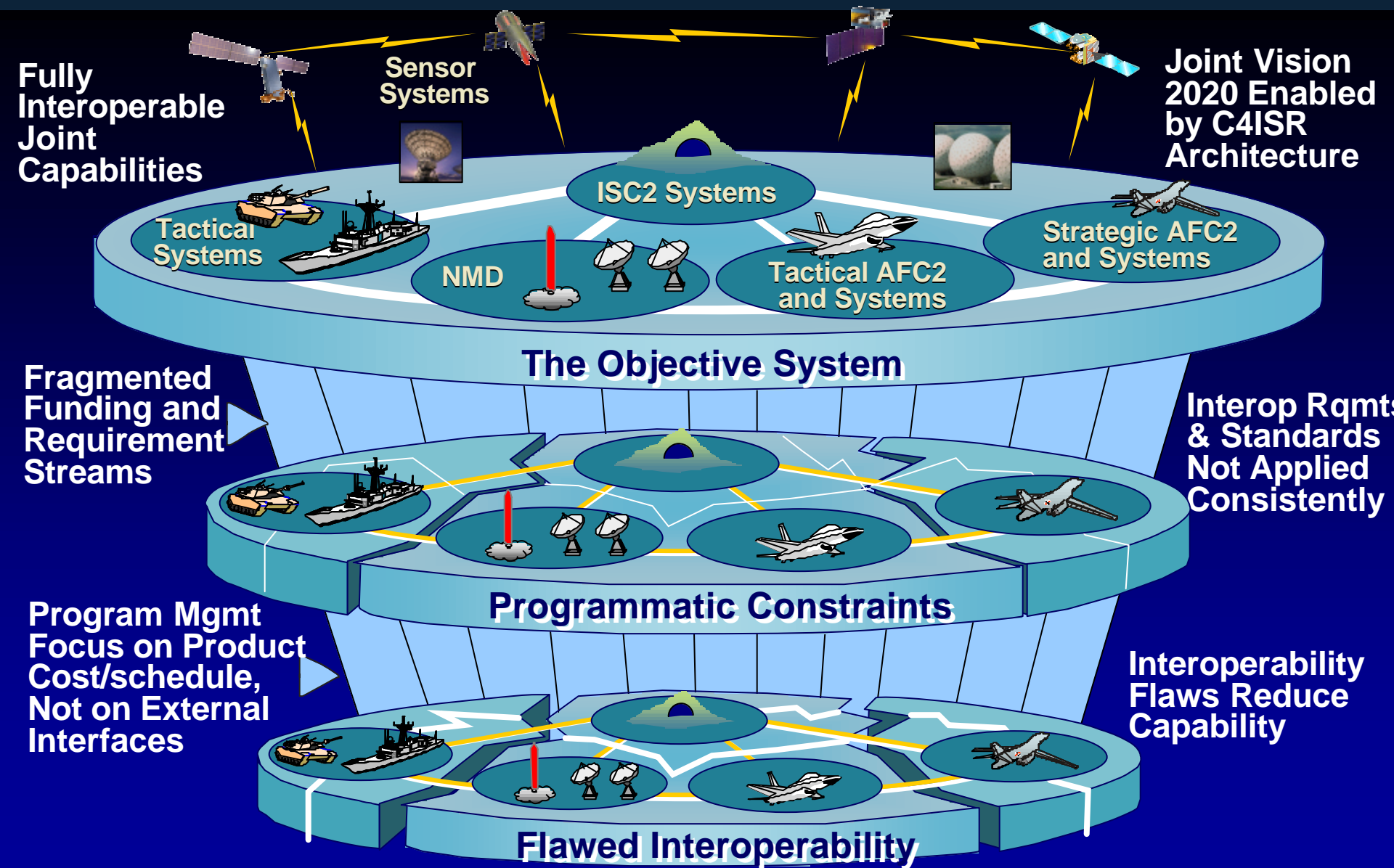
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# ***Main Points....***



- **Information-Enabled Warfighting: Powerful, Inevitable, & Fragmented**
- **Conventional Approaches to Interoperability Not Adequate to Produce Integrated Military Capability**
- **Capability Integration is an Emerging Technical and Managerial Competency**

# The World We Live In— The Challenge of Joint C4I Interoperability



# ***Mechanisms for Overcoming Flawed Interoperability Are Flawed***



Objective	Mechanism	When Applied	Effectiveness
An Effective, Integrated Military Capability		Requirements Development	Still in Early Stages; Many Issues;
Procurement			
Force Components	Messaging & Infrastructure Interoperability Through Standards	Procurement	Troubled by multiplicity of standards
Operations			
	Interoperability Work-Arounds, Sustained by Training, Tactics & Procedures	OT&E; Joint Exercises; Field Operations	Expensive to conduct; costly to fix

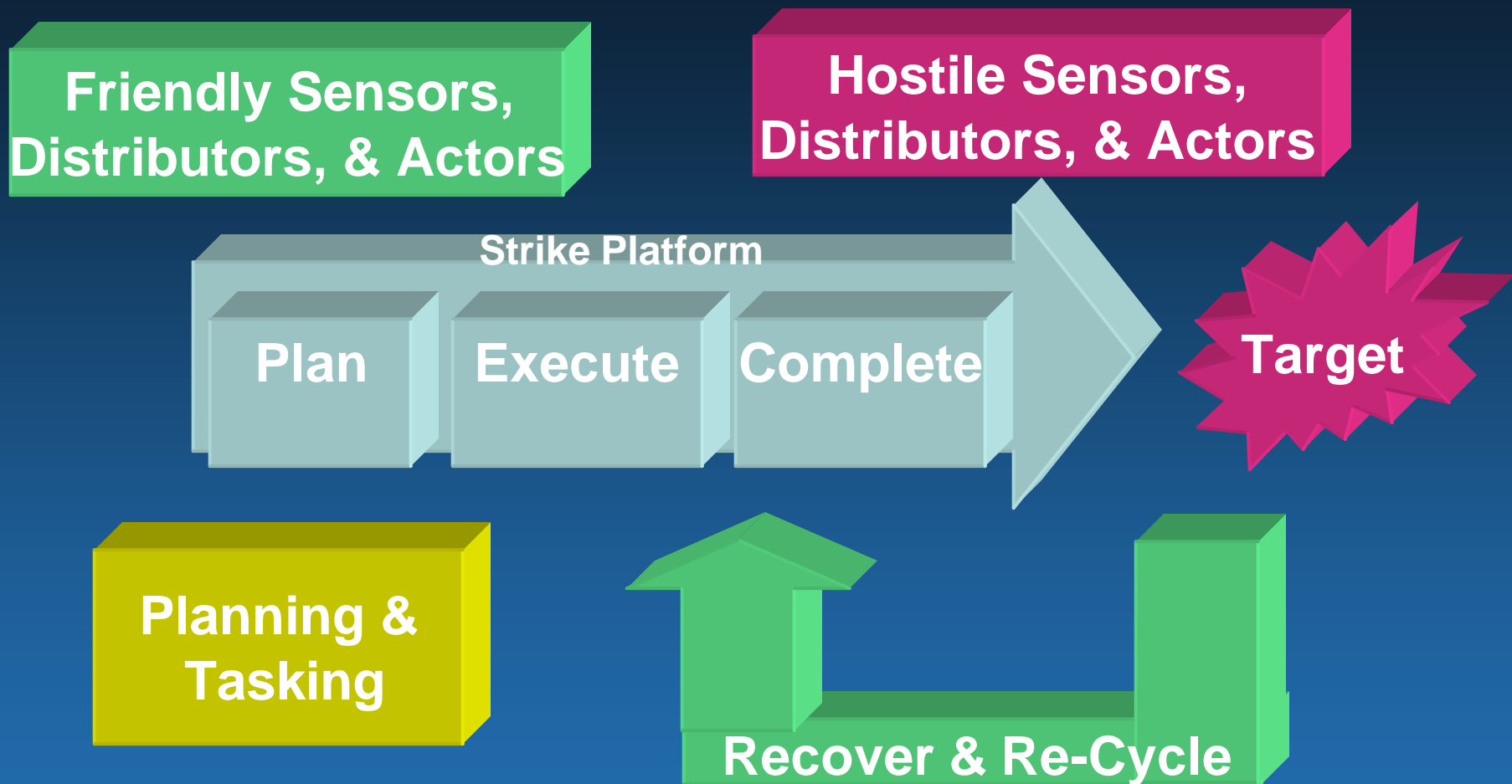
***Capabilities Today Are Integrated in the Field***



# ***Effective Attack Against Time-Critical Targets...***

## ***Capability Example***

# *Effective Attack Against Time-Critical Targets Demands Integrated Operations*



*Fragmentation & Process Bottlenecks  
in Planning & Tasking Limit Performance*

# Time-Critical Targeting Constellation is Assembled in the Field



<b>Find</b>	U-2	Nat'l	Rivet Joint	UAV	JSTARS
<b>Fix</b>	F-16CJ	UAV	JSTARS	JSF	Rivet Joint
<b>Track</b>	F-16CJ	UAV	JSTARS	Rivet Joint	JSF
<b>Target</b>	F-16C	F-16C	F-16C		
<b>Attack</b>	HARM	Maverick	JDAM		
<b>Assess</b>	U-2	UAV	JSTARS		

## Requires...

- CONOPs Alternatives That Utilize Available Assets
- Performance Estimates for Each CONOPs Thread
- Assets That Interoperate Adequately to Support the CONOPs



# Capability Integration Challenges....



- **Moving Capability Integration Upstream**
  - Complicated -- Overlays Capability Portfolio on Product Portfolio
  - Messy – Sorting Through Mixes of New and Legacy Systems, Identifying & Prioritizing Both Product and Process Improvements
- **Understanding & Developing Capability Integration Competency – Enabling Effective Efforts**
  - Architects, Tools, Processes, Technology
  - Adopting A Value Chain Viewpoint
  - Spans Technical & Business Aspects

**Benefits: Capability Integration Offers A Systematic Way to Better Extract Value, Improving Performance, Reducing Costs**



# Moving Capability Integration Upstream

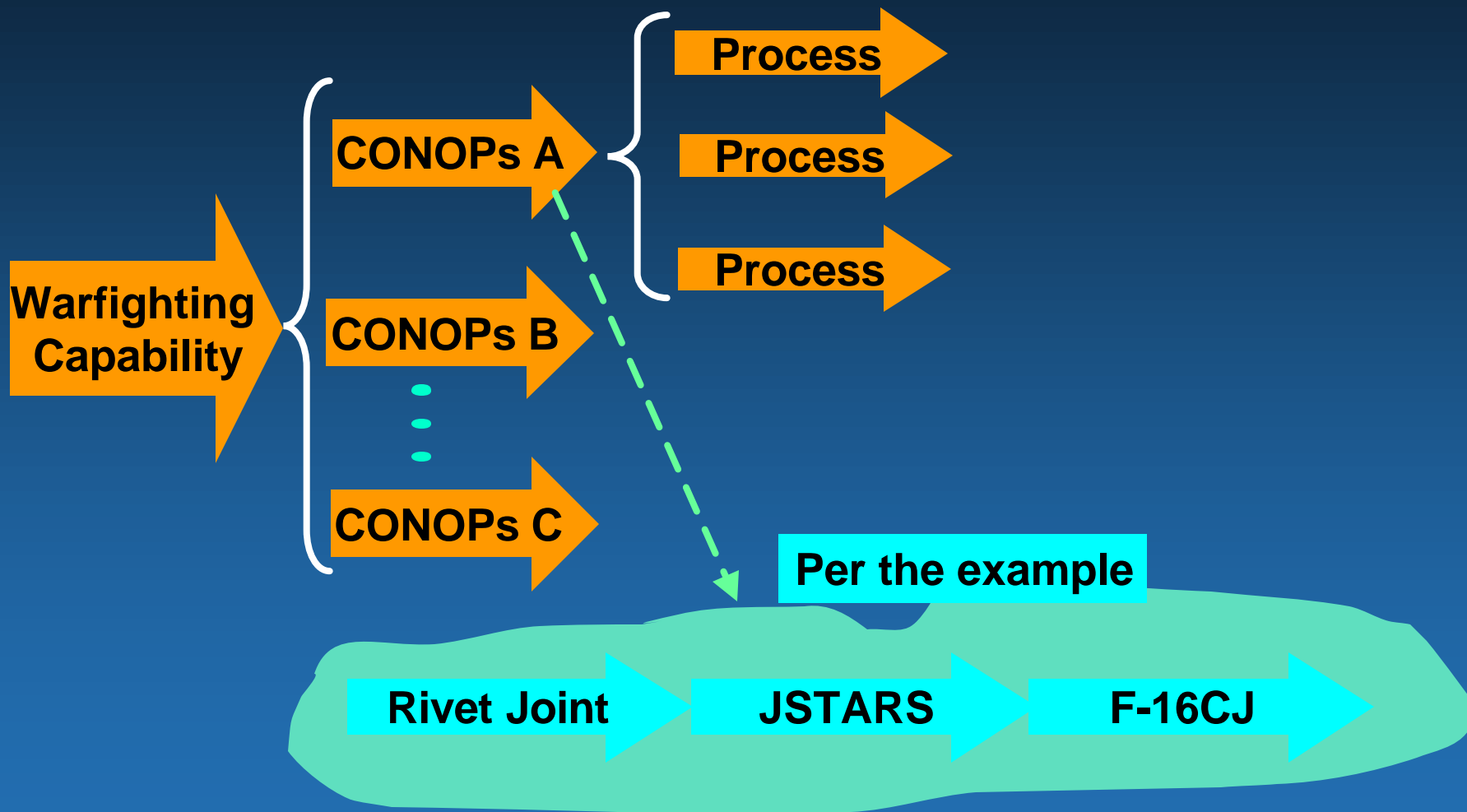
# Alignment...



- **Capability** for This Presentation Means...
  - Improved Effectiveness of Locating Mines in Surf
  - Effective Attack Against Time Critical Targets
  - ...
- A **Capability** is Characterized By...
  - An Operational Architecture...Commander's Intent
  - Process Architecture...Who Does What When
  - An Information Architecture... Supports The Process
  - Conforming Components...The Implementing Agents & Actors
- **Capability Solutions** Are Threads Linking Conforming Components Into an Operational Whole

***Multiple Solutions Are the Rule***

# One Capability---Multiple Solutions

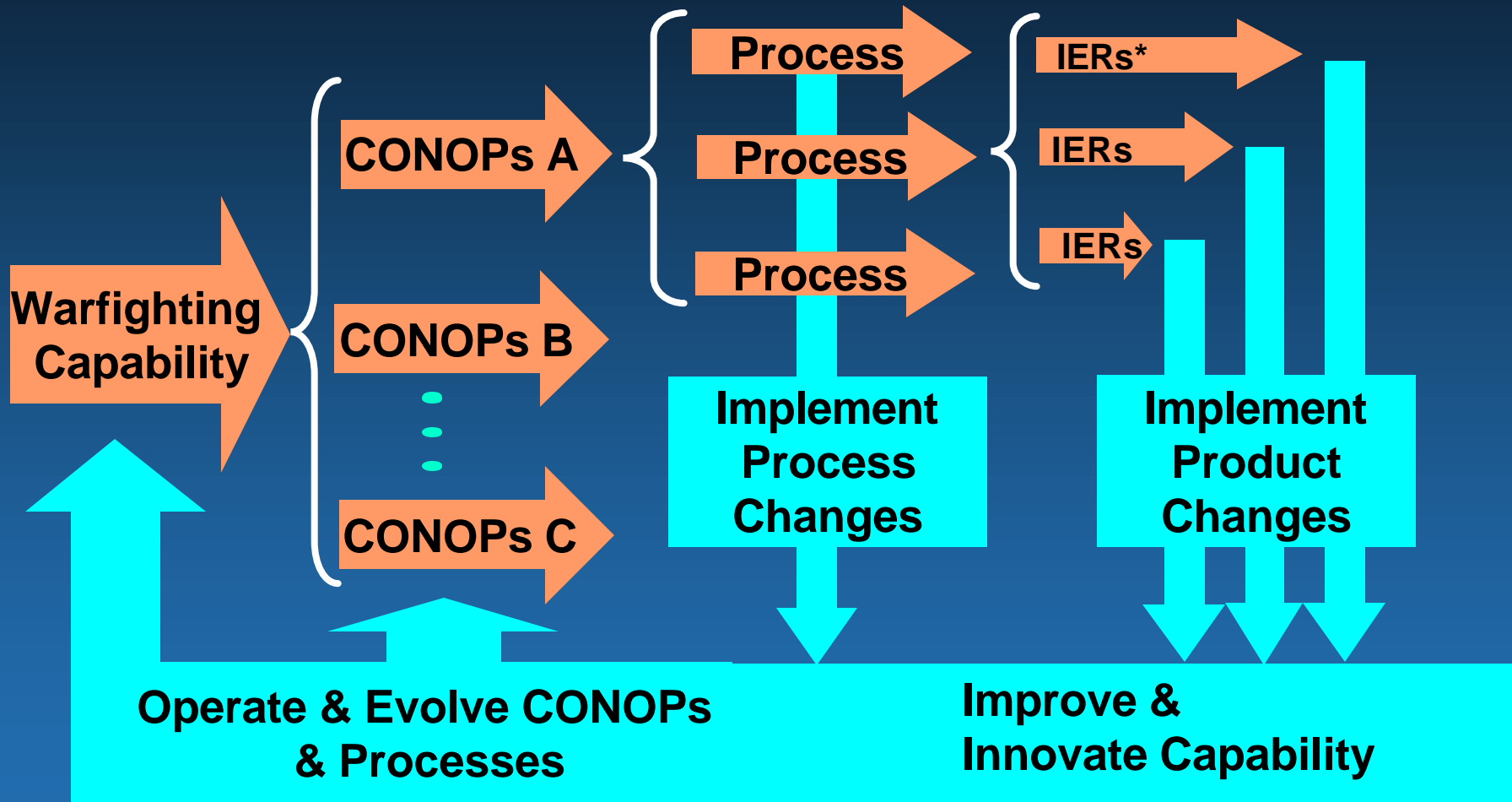


# Capability Implemented Through Multiple Threads (Solutions)



<b>Find</b>	U-2	Nat'l	Rivet Joint	UAV	JSTARS
<b>Fix</b>	F-16C	UAV	JSTARS	JSF	Rivet Joint
<b>Track</b>	F-16C	UAV	JSTARS	Rivet Joint	JSF
<b>Target</b>	F-16C	F-16C	F-16C	F-22	JSF
<b>Attack</b>	HARM	Maverick	JDAM	WCMD	JSOW
<b>Assess</b>	U-2	UAV	JSTARS	Rivet Joint	JSF

# Capability Improvement Opportunities: CONOPs, Processes, Technology



\*IERs: Information Exchange Requirements

# Capability Integration Needed to Systematically Improve Performance

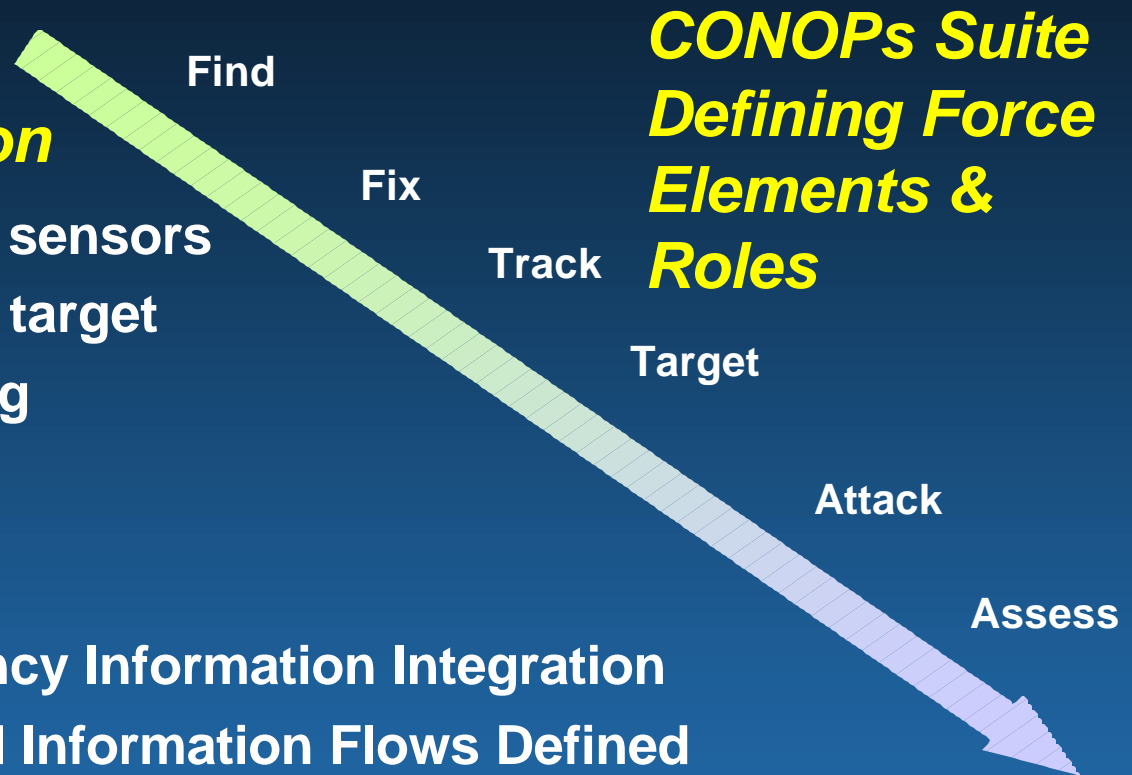


## Technology Innovation

- Network Integrated sensors
- Maintain identity of target
- Fire-control tracking
- ...

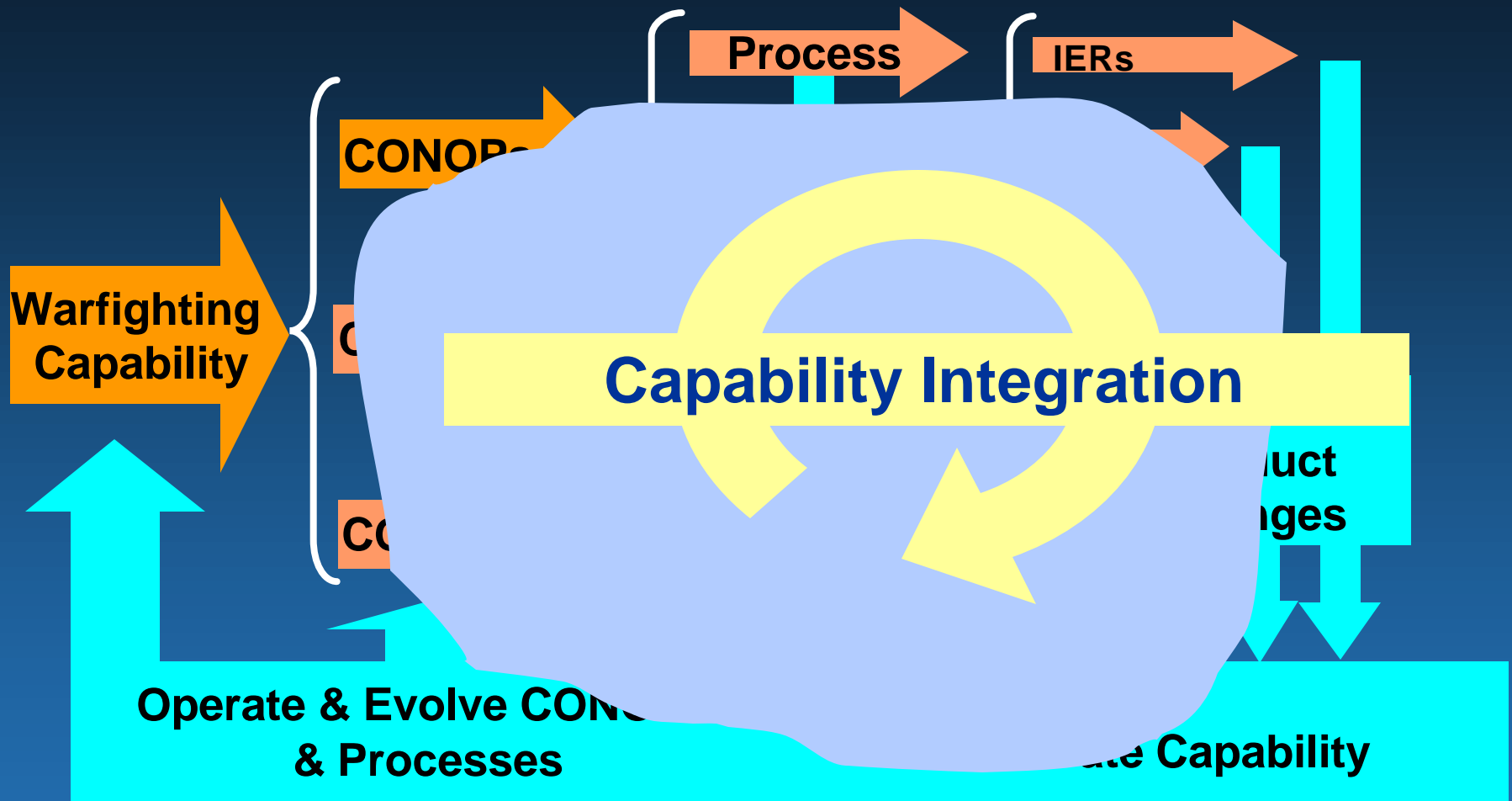
## Process Innovation

- Enable Low Latency Information Integration
- Support Required Information Flows Defined
- Support for Rules of Engagement
- ...



**Capability Solutions Co-Evolve CONOPs, Processes, Technology, and Interoperable Platforms & Systems**

# Upstream Capability Integration Matures Capability Solutions to the Field Commander



*Improvements Scope Includes Processes, Interoperability of Both Legacy & New Systems, and Technology*



# ***Perceptions: Implementing Capabilities***



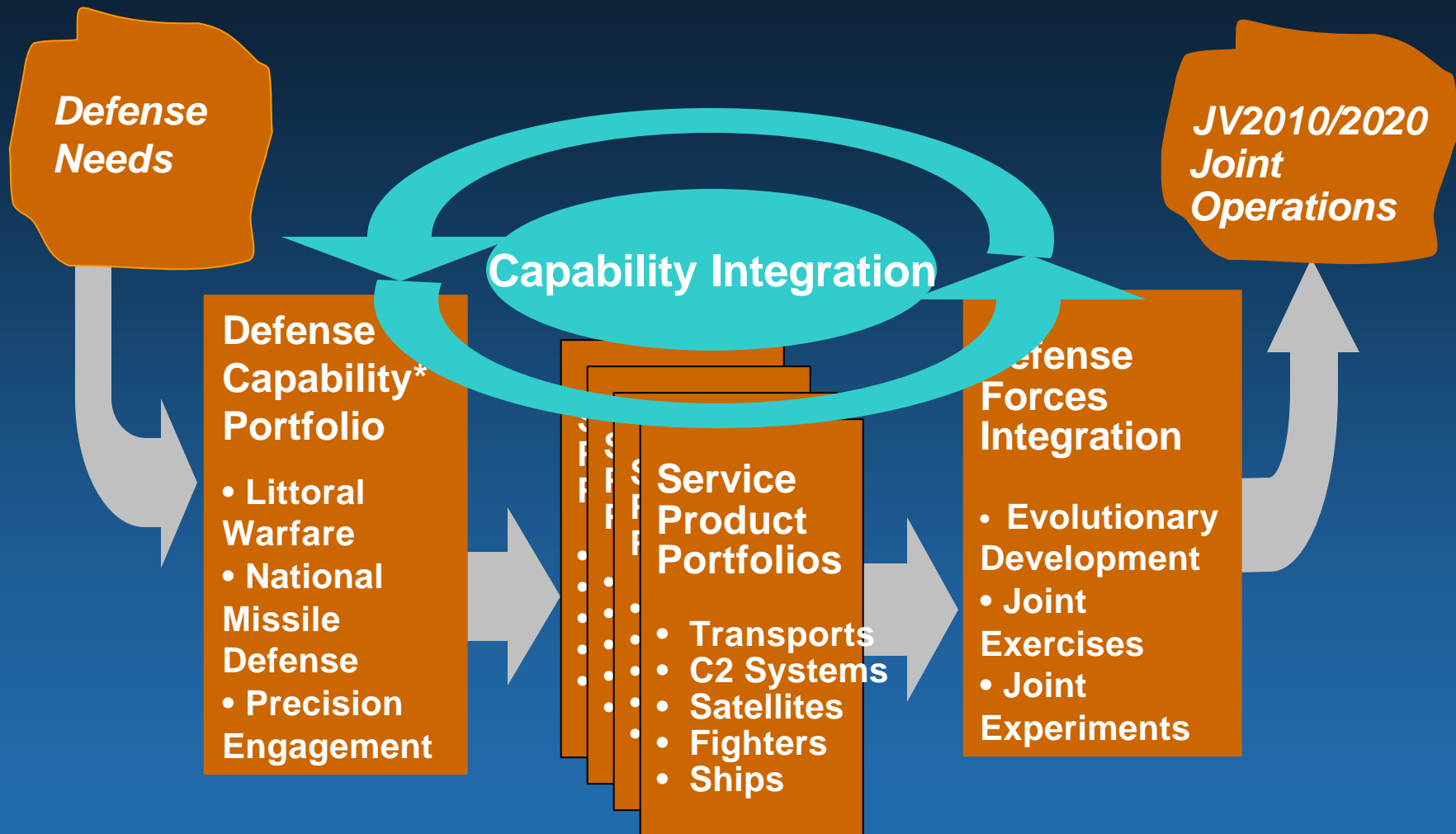
- **Strong Movement to Capability-Based Requirements**
- **Role & Importance of Interoperability Recognized**
- **Role of Architectures and Interoperability Standards Not Consistently Recognized**
- **Many Issues In Information Exchange Requirements Management**
- **The USG Has No Acquisition Agent Today (Exception: BMDO) With the Scope to Procure an Integrated Solution**
- **UK MoD Has Taken Strong Organizational Steps**

***Emerging Sense — Where is the Capability Integrator?***



# ***Capability Integration...*** ***An Emerging Discipline***

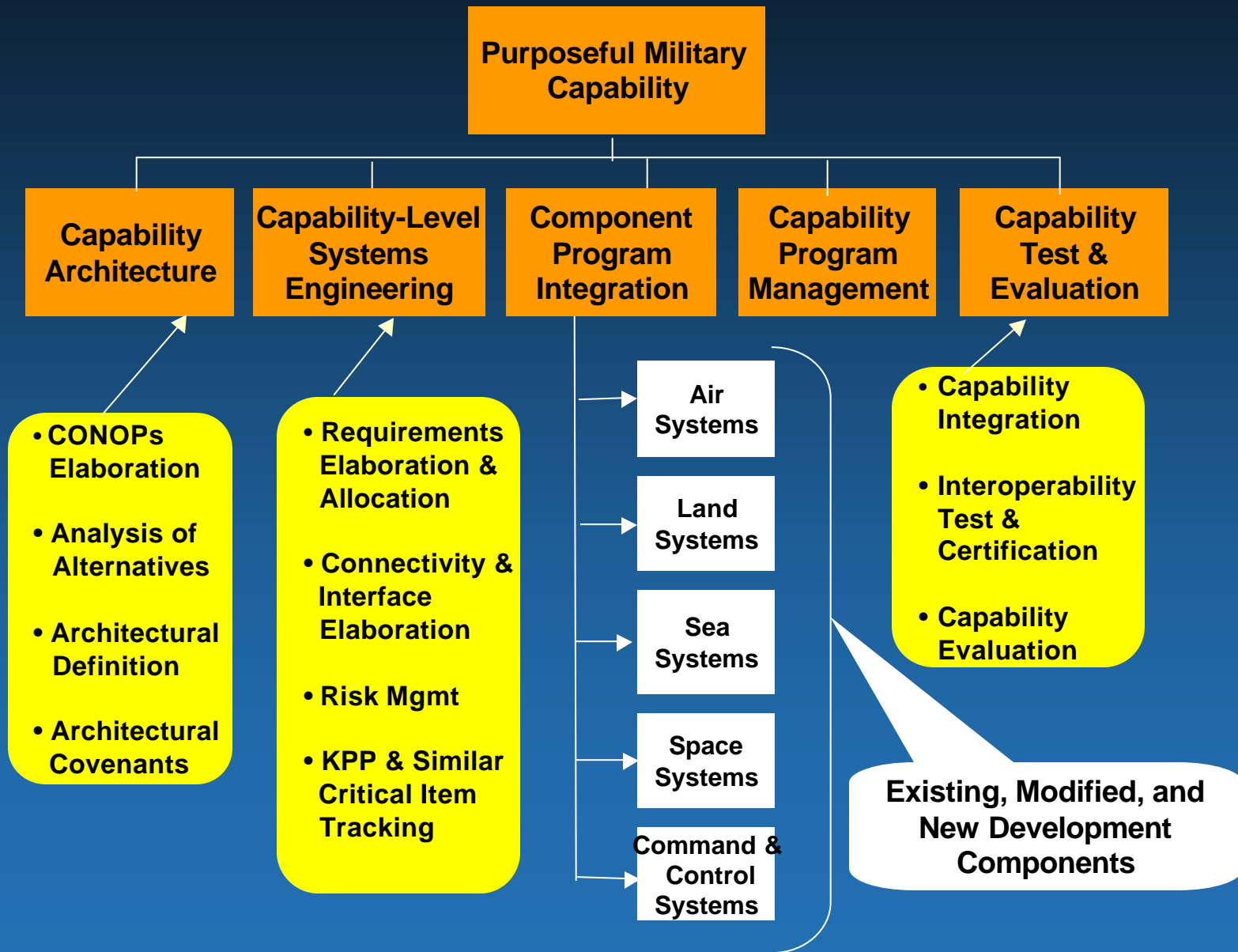
# Defense Product Flow... Next-Generation Process



\*Notice these capabilities are at an even higher level than we have been addressing; the parsing of capabilities is another challenge.

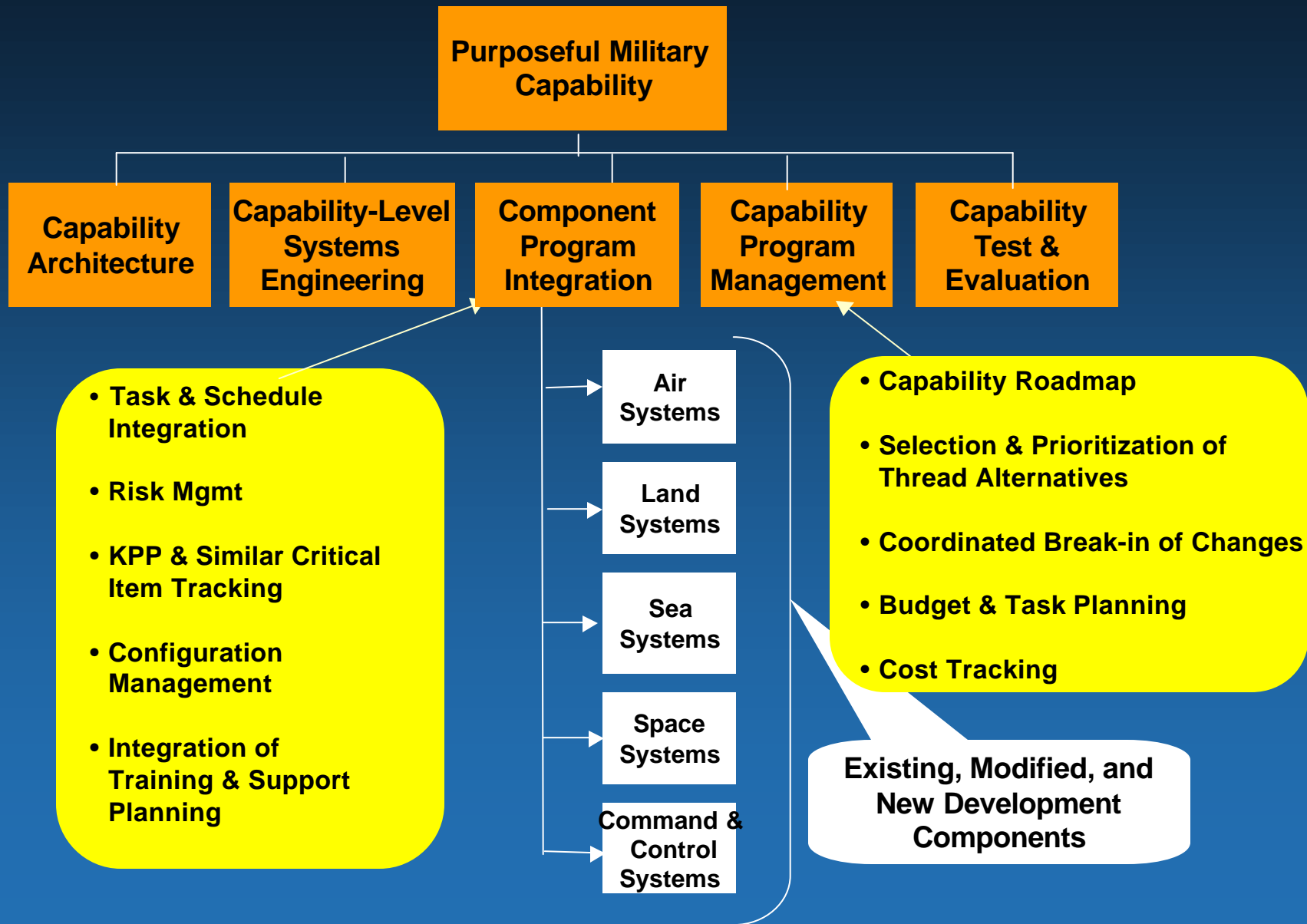
# Work Breakdown Structure Template for a Capability Program

1/2



# Work Breakdown Structure Template for WBS Template for a Capability Program

2/2



# ***Signs of Progress...***



- **UK MoD Re-Organizes Around Capability Areas**
- **Strong Initiative in USN Toward Capability Focus**
- **USAF Air Material Command Has Instituted An Enterprise Initiative**
- **JROC Capstone Requirements Documents**
- **DoD Architecture Framework**
- **Joint Chiefs Define Joint Mission Areas**
- **Adoption of Experimentation & Spiral Development**

***Lockheed Martin Has Companion Initiatives***

# Our Corporate Initiatives in Capability Integration



***Purposeful  
Interoperability:  
Providing a  
Defined Capability***

- **Integrated Mission Architecture Team**
  - Strategic Analysis
  - Architecture Development
  - Tasked by Executive Management

***Messaging  
Interoperability***

- **SoS/Interoperability IPT**
  - Virtual & physical cross-company forum
  - Share IERs & C4I Plans - CVN-77, DD-21, F-22, JSF
  - Develop battlespace context for programs
  - Sponsor cross-corporate Mobile Target Initiative

***Infrastructure  
Interoperability***

- **Project Rainbow**
  - Interoperability Solutions
- **Global Vision Net & Center**
  - Communications Backbone
  - Collaborative Portals

# Global Vision Network & Global Vision Center...

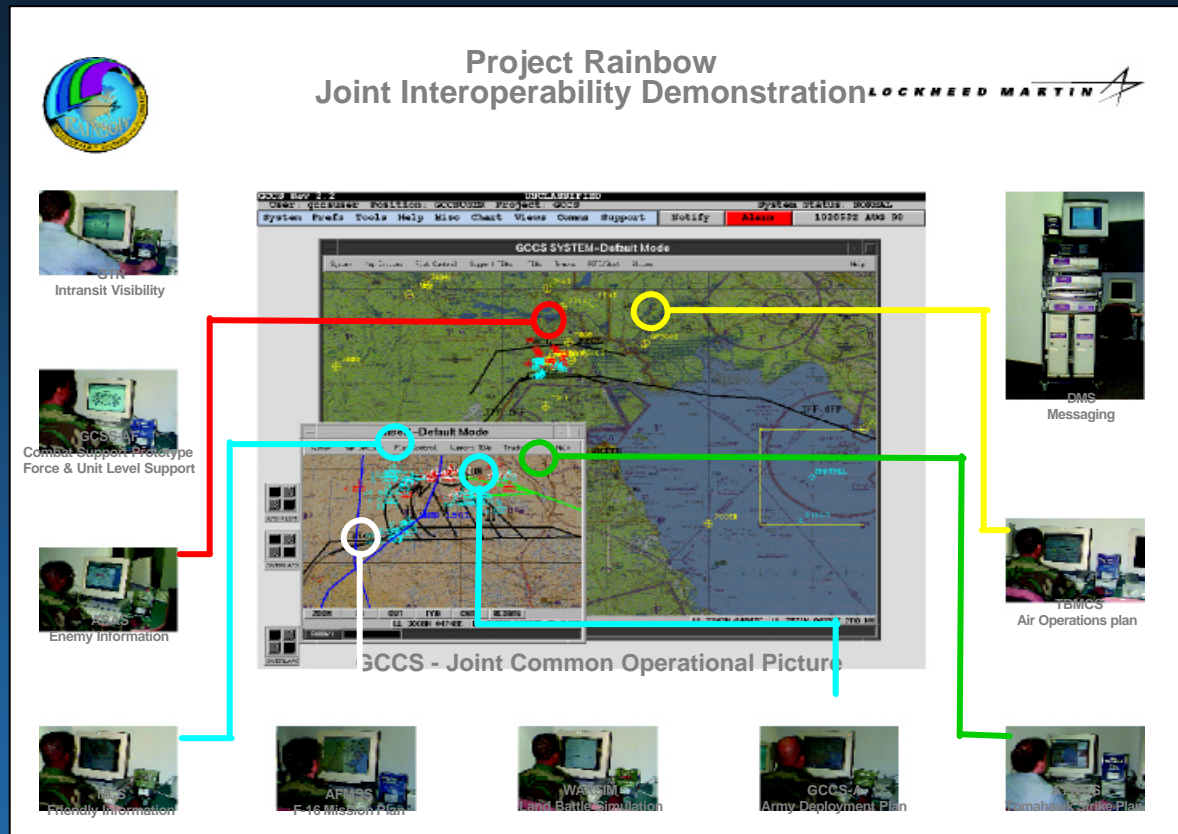


- *Experimentation*
- *Design*
- *Development*
- *Demonstration*
- *Test*

**A Network-Centric Approach to Distributed Visualization, Collaboration, and Experimentation**



# Project Rainbow...Interoperability Test Bed and Demonstration Laboratory



- **11 operational and prototype systems**
  - C4I, Combat Support, Simulation
  - Joint, Air Force, Army, and Navy
- **Environment for prototyping, evaluation, demonstration**
  - Technology and operations integration

# ***Main Points....Recap***



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